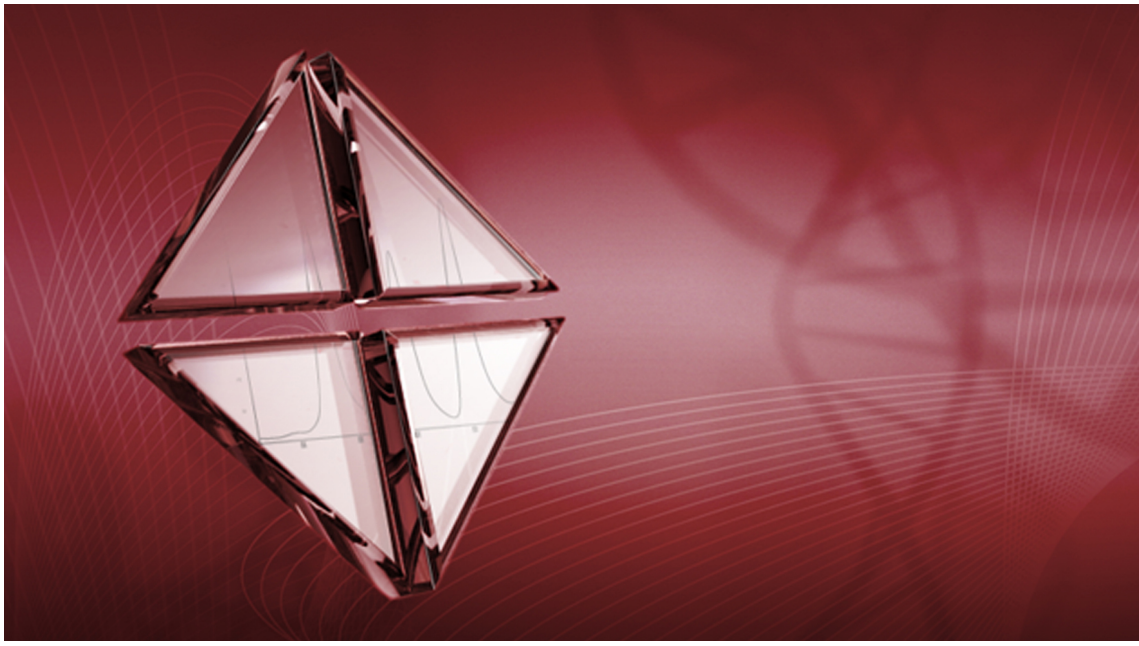
OPC Import
UNICORN™ extension

User Manual



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1 Introduction

Purpose of the User Manual

The OPC Import UNICORN extension User Manual describes how to set up a client computer for OPC import to UNICORN and how to use OPC Import UNICORN extension.

About OPC Import UNICORN extension

OPC Import UNICORN extension is used for importing data from an OPC HDA (Historical Data Access) server to UNICORN for evaluation. All result evaluation is performed in UNICORN.

Software declaration of conformity

OPC Import UNICORN extension together with a compatible UNICORN version is technically compatible with all relevant sections of FDA 21 CFR Part 11.

A part 11-system assessment checklist is available on request from your local GE Healthcare representative.

Typographical conventions

Menu commands, field names and other text items from the software are quoted exactly as they appear on the screen, in a bold italic typeface:

Example: ***Manage configurations***

Menu paths are shown in a bold italic typeface with a separating colon between each level:

Example: ***OPC Import:Manage configurations***, that is, the menu option ***Manage configurations*** from the ***OPC Import*** menu.

Text that the user must type (not a regular part of the graphic user interface), is represented by a monospaced typeface:

Example: `Evaluation stop`

2 Settings

Introduction

This chapter describes how to set up a computer for OPC import to UNICORN, how to enable HETP (Height Equivalent to a Theoretical Plate) calculations, how to create start/stop and injection markers and how to make an individual column selection.

Client computer and database server communication

To access data from a historical database, correct firewall and DCOM settings must be defined to establish communication between clients and servers via DCOM.

An OPC installation program may be run to establish communication between servers via DCOM. For DeltaV™, for example, there is a software program, DeltaV OPC Remote, that will automatically do necessary settings on the UNICORN computer to establish OPC communication between UNICORN and the customer control system via DCOM.

If the client computer has a Windows® firewall installed, UNICORN installation software will automatically open the ports necessary for DCOM during installation of UNICORN. If other firewall solutions are used, make sure that TCP port 135 is open for DCOM. Refer to the necessary settings in the vendor's OPC server instructions for manual set up.

Note: *The firewall must be enabled during the installation of the OPC server.*

Note: *Make sure that both the client computer and the server have the same time zone settings.*

Installation of OPC Import UNICORN extension

To install OPC Import UNICORN extension, see *Extension management* in *UNICORN 6.4 Administration and Technical Manual*.

A new item, ***Extensions***, will appear in the menu bar in the UNICORN ***Evaluation*** module after installation of OPC Import UNICORN extension. Two new dialogs, ***Manage configurations*** and ***Select a result to import***, will be accessible under the ***Extensions:OPC Import*** menu.

Enable HETP calculations in UNICORN

In order to allow UNICORN to calculate HETP values on the imported data, certain criteria need to be fulfilled.

Stage	Description
1	The configuration that is used for the import needs to include an injection parameter. Following settings have to be implemented: • The injection parameter needs to be set up in the client's control system. For details, see *Injection marker, on page 9*. • The curve type needs to be set to ***Injection*** after it has been included in ***Selected items*** in the ***Manage configurations*** dialog in order to be recognized as an injection parameter by UNICORN.
2	An individual column, that has previously been defined in UNICORN, needs to be selected prior to the import in the ***Select a result to import*** dialog. For details, see *Column selection, on page 11*. ***Note:*** *Make sure that the correct bed height and all other necessary parameters are set for the column*

For more information about HETP calculations and peak asymmetry factors, see *Evaluate a column performance test* in *UNICORN 6.4 Evaluation Manual*.

Note: *It is not possible to save* ***Column Performance Statistics*** *in* ***Column Logbook*** *for an imported result*.

Evaluation window identification

Start/Stop marker

To identify an evaluation window with Start/Stop markers, event markers `Evaluation stop` and `Evaluation start:` have to be set up in the OPC server. The detection may be done automatically or manually from the control system, and requires an event parameter in the control system from where the historical data shall be imported.

Follow the instructions below to set up an start/stop marker.

Step	Action
1	Create a parameter with parameter type ***STRING*** in the control system.
2	Enter a name for the parameter, for example `EVAL_START_STOP`. (The parameter name is of no importance. Any name can be entered for the parameter.)
3	Make sure that the parameter has ***History Collection*** enabled and is stored in the historical database.
4	Make sure that ***Data reduction*** is enabled to avoid an event registration every scanning interval (sample period).
5	Set parameter ***Collect at least every*** to as long as possible, for example 24 hours, since this data collect may create an event that may be misinterpreted as an evaluation start or stop event.
6	Enter the text `Evaluation stop` and `Evaluation start: "xyz"`, where `"xyz"` may be, for example, a batch number or any other identification text. ***Note:*** *The text strings must exactly match the characters for `Evaluation Stop` and `Evaluation Start:`, but any text can be added after colon.* *Result:* UNICORN will look for those text strings to define import start and end times for the evaluation window.

Batch database

A Batch Historian SQL server may be available for DeltaV to identify the start and stop points of the batch and to define relevant values of measurement.

Injection marker

To be able to calculate HETP, UNICORN requires an event that defines where to start the calculation.

The calculation requires an event parameter, an injection marker, in the control system from where the historical data shall be imported.

Follow the instructions below to set up an injection marker for HETP calculation.

Step	Action
1	Create a parameter with parameter type ***STRING*** in the control system.
2	Enter a name for the parameter, for example `MARKER_STRING`. (The parameter name is of no importance. Any name can be entered for the parameter.)
3	Make sure that the parameter has ***History Collection*** enabled and is stored in historical database.
4	Make sure that ***Data reduction*** is enabled to avoid an event registration every scanning interval (sample period).
5	Set parameter ***Collect at least every*** to as long as possible, for example 24 hours, since this data collect may create an event that may be misinterpreted as an injection.
6	Enter a text to the parameter, for example `INJECTION`. (The exact text string is of no importance. Any text string can be entered for the parameter.) *Result:* UNICORN will look for that event to define where to start the calculation.

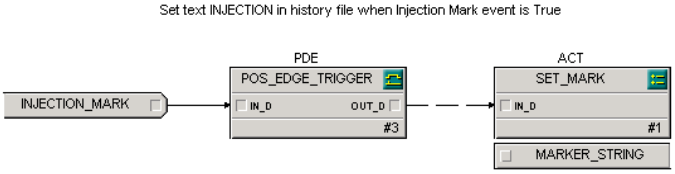
Tip: *For a programing example of an injection marker for DeltaV, see below.*

Programing example of an injection marker for DeltaV

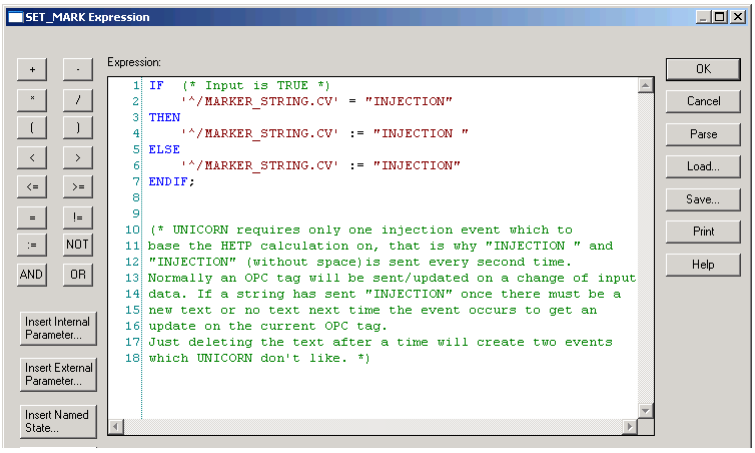
Follow the instructions below to set up an injection marker for HETP calculation for DeltaV.

Step	Action
1	Set up an injection marker in the control system according to the the general instructions above.

Step	Action
2	Add the following three logical blocks together in the sequence:



3	Add the expression showed below in the ***SET_MARK Expression*** dialog in the Action block. (To access the ***SET_MARK Expression*** dialog, right-click on the ***SET_MARK*** in the ***ACT*** block and select ***Expression***)



Column selection

To perform result evaluation of the imported data by, for example, HETP calculation in UNICORN, correct column ID (identity) has to be specified.

Follow the instruction below to select the correct column.

Step	Action
1	Open the ***OPC Import:Select a result to import*** menu item from the ***Extensions*** menu in the ***Evaluation*** module.
2	Select the column to be used in the ***Column*** drop-down menu. ***Note:*** *If the column to be used is not present in the column list, create a new column. The procedure how to create a new column is described under Column Handling in UNICORN 6.4 Method Manual.* ***Note:*** *Make sure that a correct bed height has been entered for the individual column in UNICORN. See Column Handling in UNICORN 6.4 Method Manual.*

Note: *Make sure that the unit for the column volume equals the volume unit used for the accumulated volume item (flow totalizer) on the OPC server. UNICORN assumes that the column volume unit and the unit of the flow totalizer are the same.*

3 How to use OPC Import UNICORN extension

About this chapter

This chapter provides information about how to use OPC Import UNICORN extension.

In this chapter

This chapter contains the following sections:

Section	See page
3.1 Create and sign configurations	13
3.2 Manage configurations	15
3.3 Select a result to import	22
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3.1 Create and sign configurations

Introduction

The configurations used by OPC import should be signed by GE Healthcare. The procedure of creating and signing a new configuration consists of the following steps:

1 Create a new configuration.

2 Test the new configuration and adjust parameters if necessary.

3 Send the configuration to GE Healthcare for signing.

Create a configuration

Follow the instructions below to create a new configuration.

Step	Action
1	Open the ***OPC Import:Manage configurations*** menu item from the ***Extensions*** menu in the ***Evaluation*** module.
2	Click ***Create***. *Result:* A new configuration is created in the ***Configurations*** list.
3	Rename the configuration by clicking on the new configuration and enter the new name.
4	Select instrument system and server by adding information in the fields ***Skid***, ***Host*** and ***Server name*** or use the browse function.
5	Select information for ***Evaluation window identification***.
6	Select item(s) via ***Browse OPC server***.
7	Specify volume curve and preview curve. (This step is optional)
8	Click ***Save*** and the changes will be saved to the currently selected configuration.
9	Click ***OK***.

Test and sign a configuration

After a new configuration has been created, follow the instructions below to sign the configuration.

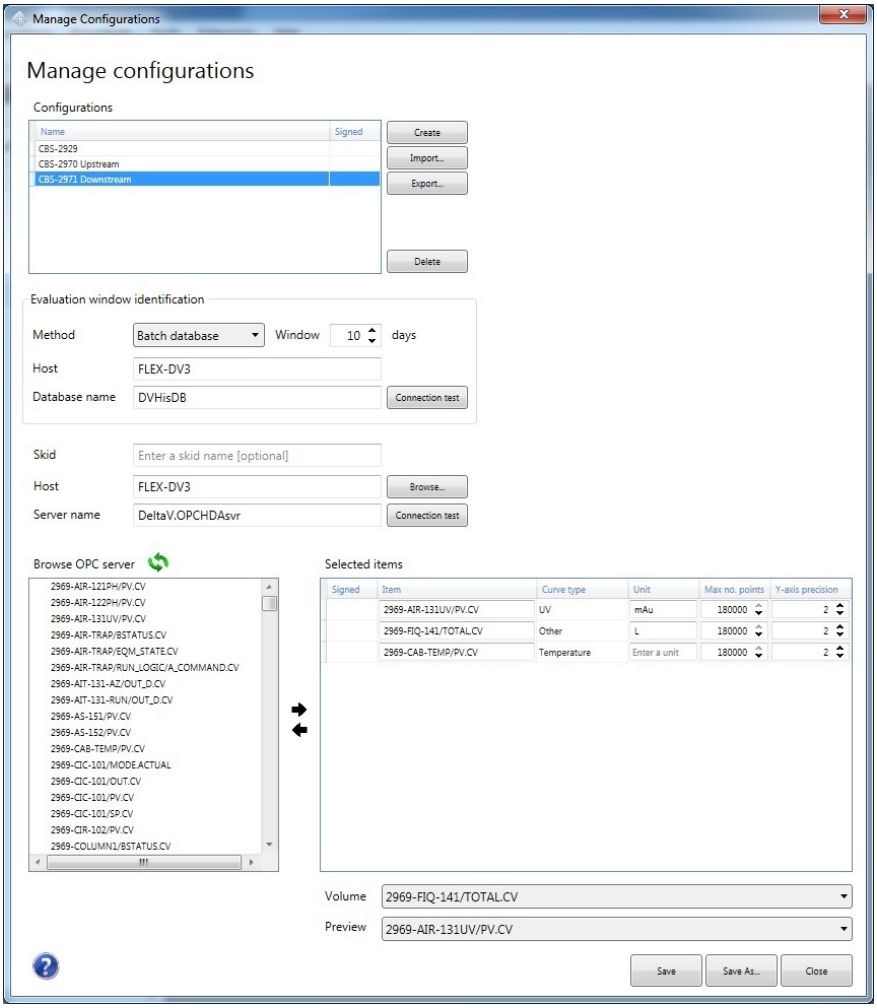
Step	Action
1	Use the new configuration to test the selected configuration settings.
2	Adjust parameters in the ***Manage configurations*** dialog if necessary.
3	Repeat step 1 and 2 until you are satisfied.
4	Select the configuration and click ***Export*** in the ***Manage configurations*** dialog to export the configuration to a selected file destination.
5	Send the configuration file by e-mail to GE Healthcare for signing. Contact your local GE Healthcare representative for more information.
6	Import the returned configuration signed by GE Healthcare into OPC Import. 1 Click ***Import*** in the ***Manage configurations*** dialog. 2 Select the configuration in the file browser. 3 Click ***OK***.

Note: *If you import data with an unsigned configuration, a message dialog will appear reminding you to sign the configuration.*

3.2 Manage configurations

This dialog is accessed by choosing the ***OPC Import:Manage configurations*** menu item from the ***Extensions*** menu in the ***Evaluation*** module.

Use this dialog to set up the configuration for the OPC import.



Configuration selection

Entry or Command	Description
Configurations	Displays a list of predefined configurations. Configurations containing only signed signals are displayed with a green check mark in the ***Signed*** column. ***Note:*** *The signed signals are locked from editing but everything else can be changed, such as name, server address, add or remove signals.* Select a configuration by clicking on the configuration of interest. The fields ***Skid***, ***Host*** and ***Server name*** will automatically be populated when a configuration has been selected.
Create	Click ***Create*** to set up a new configuration.
Import...	Click ***Import...*** to import a configuration from a file destination.
Export...	Click ***Export...*** to export the selected configuration to a selected file destination. Enter the configuration name and select the file destination in the ***Save As*** dialog.
Delete	Click ***Delete*** to delete the selected configuration.

Evaluation window selection

Entry or Command	Description
Evaluation window identification	Select an evaluation identification method in the ***Evaluation window identification*** pane.

Entry or Command	Description
Method	Specifies the identification method to use. Select a method in the drop-down menu. The following options are available: • ***None***: No identification method is selected. Is used when batch database or start/stop markers are not available. • ***Batch database***: Retrieve evaluation windows from a batch database. • ***Start/Stop marker***: Select an event marker with predefined start and end times. ***Note:*** *The selected evaluation windows method will be added to the configuration. The list of evaluation windows will automatically appear in the field under the* ***Evaluation windows*** *tab under the* ***Select a result to import*** *dialog, when retrieving the selected evaluation windows with the predefined evaluation method. See Evaluation windows tab, on page 23.*
Host	Enter the name of the host of the database. Visible only if the ***Batch database*** is selected in the ***Method*** field.
Database name	Enter the name of the database. Visible only if the ***Batch database*** is selected in the ***Method*** field.
Event marker	Entry for selecting the event marker to use for the selected identification method. Visible only if the ***Start/Stop marker*** is selected in the ***Method*** field.
Window	Defines the number of consecutive previous days for which the import extension module shall search for evaluation windows either in the database or from the event marker. This value will be the default value in the ***Number of days back*** entry under the ***Evaluation windows*** tab under the ***Select a result to import*** dialog. See *Evaluation windows tab, on page 23*.

Instrument system and server selection

Entry or Command	Description
Skid	Enter the name of the instrument system.
Host	Entry for selecting the host of the server.
Server name	Entry for selecting the name of the server.
Browse...	Click ***Browse*** to open a dialog where you can browse and select an OPC server.
Connection test	Click ***Connection test*** to test that the connection with the server can be established.

Item selection

Entry or Command	Description
Browse OPC server	All items on the OPC HDA server are displayed in this field. To select an item from the OPC server: 1 Mark the item of interest in the ***Browse OPC server*** field. 2 Click on the arrow pointing towards the ***Selected items*** field or drag and drop the item to the ***Selected items*** field. *Result:* The selected item will appear in the ***Selected items*** field. To remove an item from the ***Selected items*** field: 1 Mark the item of interest in the ***Selected items*** field, field. 2 Click on the arrow pointing towards the ***Browse OPC server*** field. *Result:* The selected item will disappear in the ***Selected items*** field. ***Note:*** *If you try to delete a selected item, a message dialog will appear asking you if you want to continue the operation.*

Entry or Command	Description
Selected items	Selected items from the OPC server are displayed in this field. The ***Selected items*** field display the following information: • ***Signed***: A green check mark in this column indicates that this item is signed. • ***Item***: Displays the name of the selected item. • ***Curve type***: Displays the curve type of the item. Click on the curve type text field and enter correct curve type if necessary. • ***Units***: Enter what unit of measurement that should be displayed on the Y-axis. • ***Max no. points***: Specifies the maximal number of data points in the resulting curve. Change the value by using the arrows or entering a new value in this field. • ***Y-axis precision***: Specifies the precision (number of decimals) of the Y-values for the resulting imported curve in UNICORN. Change the value by using the arrows in this field. The precision of the y-values is used when viewing the vertical marker in the ***Evaluation*** module.
Volume	Specifies the accumulated volume (flow totalizer) for the specific Skid. There are three possible bases for the X-axis in UNICORN, that is time, volume and CV (column volume). To display volume units on the X-axis for the imported data, a volume curve has to be selected. Select a volume curve from the selected items in the drop-down menu.
Preview	Specifies a preview curve for the analysis. Select a preview curve from the selected items in the drop-down menu.

Entry or Command	Description
	Click this icon to refresh the information for the item selection. Use this function when settings have been changed, since previous information is not automatically updated.

General commands

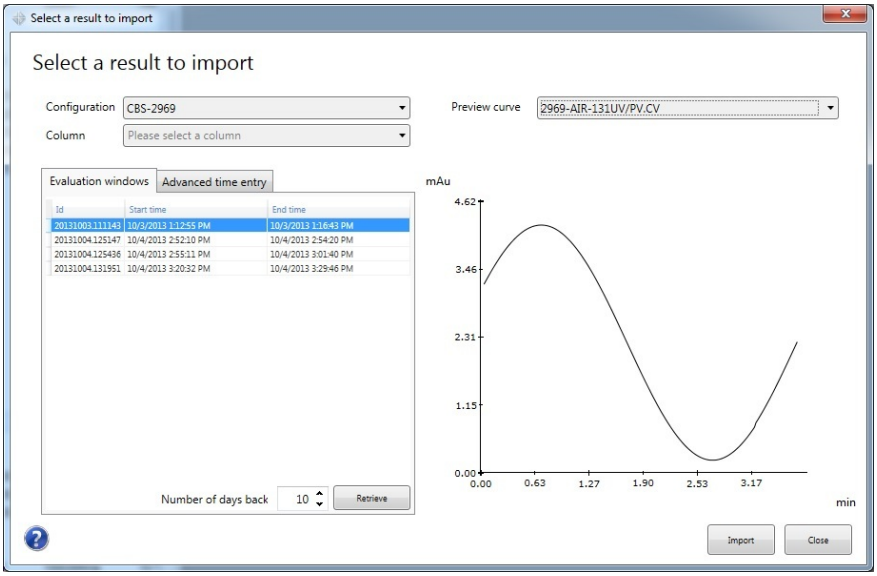
Entry or Command	Description
Save	Click ***Save*** to save your configuration.
Save As...	Click ***Save As...*** to save your configuration with a new name on a desired file destination.
Close	Click ***Close*** to close the dialog.

3.3 Select a result to import

This dialog is accessed by choosing the ***OPC Import:Select a result to import*** menu item from the ***Extensions*** menu in the ***Evaluation*** module.

Use this dialog to select an OPC result to import.

It is possible to obtain information about the actual import, such as time of import, configuration used for the import and if any items required a resolution adjustment. Such information is available through the ***Evaluation*** module by choosing ***Documentation:Result Information:Data migration***.



General settings and commands

Entry or Command	Description
Configuration	Specifies the configuration to be used in the evaluation. Select a configuration in the drop-down menu.
Column	Specifies the column to be used in the evaluation. Select a column in the drop-down menu. ***Note:*** *For details about correct bed height settings and creating new columns, see Column selection, on page 11, and Column Handling in UNICORN 6.4 Method Manual.*

Entry or Command	Description
Preview curve	Specifies the preview curve. Select a curve in the drop-down menu. *Result*: A graph of the selected curve will be displayed in the dialog.
Import	Click ***Import*** to import the selected time interval. ***Note:*** *If a selected interval contains more data points than can be retrieved from the OPC server, then only the maximum number of data points that can be retrieved from the OPC server will be imported from the start time.*
Close	Click ***Close*** to close the dialog.

Evaluation windows tab

Use this tab to select an evaluation window.

Entry or Command	Description
Id	Displays the Id of the suggested evaluation window.
Start time	Displays the start time for the corresponding Id.
End time	Displays the end time for the corresponding Id.
Number of days back	Defines the number of consecutive previous days for which the import extension module shall search for evaluation windows either in the database or from the Start/Stop marker. If necessary, change the value by using the arrows in this field. ***Note:*** *This time frame window is automatically predefined from the **Window** entry in the **Manage configurations** dialog. See Evaluation window selection, on page 16.*
Retrieve	Click ***Retrieve*** to retrieve the evaluation windows.

Advanced time entry tab

Use this tab to manually set the start and end times for the selected evaluation window.

Entry or Command	Description
Start time	Specifies the start time. Click the down arrow to open a droplist calender. Use the arrows within the ***Start time*** field to increase or decrease the start time.
End time	Specifies the end time. Click the down arrow to open a droplist calender. Use the arrows within the ***End time*** field to increase or decrease the start time.
Duration	Displays the duration that is specified by the selected ***Start time*** and ***End time***. ***Note:*** *The duration will be calculated automatically from the specified start and end times.*

3.4 OPC data processing

Introduction

All data will be processed by an OPC import algorithm to allow result evaluation in UNICORN.

Regularly sampled data (all data points are separated with equal distances) is used in UNICORN in order for evaluation algorithms to function optimally. However, data from an OPC HDA server does not need to be regularly sampled, and may be irregularly sampled. Furthermore, a data curve from UNICORN contains a maximum of 180 000 data points in order guarantee optimal responsiveness of the UNICORN application.

The OPC import algorithm has been developed to comply with the UNICORN requirements.

OPC import algorithm

In the OPC import UNICORN extension, the algorithm operates as follows:

1 The shortest distance between two data points of the imported data is calculated. This distance correspond to the data resolution in the OPC historical database.

2 The algorithm estimates if it is possible to add 180 000 data points or less between the time of the first and the time of the last data point of the imported item.

3 If the number of data points exceed 180 000, a new shortest distance is calculated with a maximum of 180 000 data points.

4 Data points are then added with this distance from the start point (start time) by linear interpolation. The algorithm calculates the y value for the data point to be added by interpolating the value between the two actual values on each side of the data point.

The resolution from the OPC HDA server is maintained if no more than 180 000 regularly sampled data points (with a distance between the data points equalling the shortest distance from the OPC HDA server) are required to be created for the length of the time interval.

Note: *UNICORN does not support import over 180 000 data points. Information about curves for which the algorithm has changed the resolution (i.e., changed the shortest distance between two data points) is available under the* ***Data migration*** *tab under* ***Documentation:Result Information*** *in the* ***Evaluation*** *module.*

Note: *Other limits may apply for OPC servers from other providers.*

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